NAVAL SAFETY COMMAND
SAFETY AWARENESS DISPATCH
SA 25-19

# Things Falling Off Aircraft - TFOA


File photo not associated with a mishap.

Things Falling Off Aircraft (TFOA). So, what are these '*things*' you ask? Well… it's a lot of things—literally. The list is long and varied. It includes aircraft panels, landing gear doors, windows, door handles, aircraft lighting, search lights, lip lights, seat cushions, eye protection, rescue strops and fuel caps to name a few. An overview of the data reflects one incident every day on average over the past four and a half years, almost $20 million in parts and repairs, not to mention the hit to aircraft readiness and the increased workload it creates for our Navy and Marine Corps team. In short, it's a problem. There is no single solution, each incident is distinct, but there's a lot of room for improvement. Please read on and try to apply the examples to your own situations with a continuous process improvement mindset.

- At Least They Were All Accounted For. The crew returned from a successful functional check flight following a main rotor blade replacement. When they taxied to the line area, the awaiting maintenance crew noticed the aircraft was missing a portion of the trailing edge panel on the vertical stabilizer. At some point during the flight, the panel departed the aircraft, thankfully not damaging other flight control surfaces upon departure or hurting anyone. As it turns out, the panel was tacked in place with only about one sixth of its required fasteners, the rest were found in a bag in the shop. The repairs cost over $260,000. The report confirmed there were multiple maintenance electronic paperwork issues ranging from improper signoffs to the sharing of passwords, where the person signing for the work wasn't the person performing the work. *—This **normalization of deviance**, (where bending of the rules becomes the norm) removed a layer of protection that ensures the aircraft is not released safe-for-flight with incomplete or unaccounted-for maintenance actions. Another protective layer that didn't measure up rested with the crew's pre-flight inspection. No one recognized over 20 fasteners missing from a single panel. A visual inspection necessitates intentionally looking while not being sidetracked or distracted. Going through the motions without focus will result in things being missed. Our business requires focus and abiding by the rules that are in place. Be thorough and be intentional.*

- Misaligned Priorities Take a Toll. A pilot completed his aircraft walk-around, then proceeded with starting the aircraft. During the start-up sequence, the plane captain (PC) positioned in front of the aircraft, tried—but failed—to get the other PC's attention to identify who was manning the fire bottle. Unable to establish comms, he refocused on the pilot and continued with the aircraft start-up. Once the aircraft passed systems checks, the PC performed final checks by walking around the aircraft. The routine included closing and securing the Maintenance Interface Panel (MIP) door, but the PC had issues closing it because the landing gear pin bag, which sits at the bottom of the MIP, was in the way of the latches. The PC pushed the pin bag down and, on the second attempt to secure the panel, noticed some of the latches were tighter than normal—*without questioning it*. After re-checking the latches, he continued with final checks, but interrupted the process again to ask another PC to verify who was manning the fire bottle. Receiving an answer, he then finished up final checks and reported to the pilot the aircraft checked good. The pilot flew the mission and returned. The post flight inspection revealed that the MIP door had flown off in flight and impacted the leading edge of the wing. Repair costs were over $350,000. *—The distracted PC missed the signs of obstructed latches, which were harder than normal to turn. The pin bag was still in the way. The abnormal latch tightness should have prompted the question "why?". The PC interrupted the launch process twice rather than prioritizing the task at hand. Had his focus been fully on executing his launch duties—rather than addressing an unrelated inquiry, his questioning attitude may have focused on the true problem.*

- Look Out Below! Crews in two aircraft were conducting training, with one as the lead aircraft and the other trailing slightly behind and below the lead. Before departing, all main landing gear and fire suppression pins (required to be removed before flight) were accounted for and stowed in each aircraft. However, the braid and lanyard (B&L)—normally attached to the pins—is not always accounted for. (*Wait ...what?*) The B&L

consists of a piece of cable with a remove-before-flight flag attached. Historically, neither flight crews nor maintainers were writing up a discrepancy when a B&L went missing (*hmmm*). The training flights ended and both aircraft landed uneventfully. The next morning, during a scheduled inspection of the trailing aircraft from the day before, the inspector found a B&L lodged in the middle of one of the blades. It was determined that during the flight, an unaccounted-for B&L fell out the back of the lead aircraft and was embedded into the proprotor of the trailing aircraft, unbeknownst to the crews at the time. This incident reduced readiness, caused over $450,000 in damage and placed additional strain on already strained manpower. *—The unaccountability of the B&Ls eventually led to an extra one being left in an aircraft cabin that became TFOA and a hazard for an entirely different crew. Missing B&Ls were not written up as 'missing' and merely replaced if they were gone.* ***GRGB****: To 'Get Better', we must first 'Get Real'. A questioning attitude (instead of business as usual) may have shed light on the issue before it became a mishap (Get Real). The pins are accounted for (like tools), why wouldn't a metal cable and lanyard that's normally attached to them be accounted for as well? Put rules in place and change the thought process for accountability of the B&Ls (Get Better).*


File photo not associated with a mishap.

- Aircraft Anxious, Panel Left Without Notice—Again. An aircraft panel was found near the fueling area by a sweeper truck operator. It was traced to a specific type aircraft and the applicable wing was notified. The wing alerted all squadron maintenance leadership, who in turn directed a one-time inspection of all their aircraft. The aircraft missing the panel was identified. Maintenance control, having custody of the aircraft, then directed a visual inspection that revealed damage to a flight control surface caused by the panel. *The good news*: communication flowed quickly to identify the aircraft and the damage the TFOA panel caused. *The not so good news*: This type aircraft has two of these panels with a single point of failure fastener known to back out over time, subsequently causing the TFOA—*it's well documented*. Until a permanent solution is employed, the near-term mitigation strategies already in place include an active wing maintenance advisory and an Interim Rapid Action Change, directing re-torque of the fastener and applying torque stripe every two weeks. Yet, it couldn't be verified whether it had been done. The torque stripe on the TFOA panel looked old and broken; the non-affected panel (*the one that didn't fall off*) wasn't torque striped. *—It's imperative that the entire team recognize and follow procedures put in place to prevent mishaps. From maintenance control directing the maintenance, to mechanics performing the action, plane captains aware and looking on their daily inspections, and the flight crews pre-flighting—clear communication of the requirement is a key element to team alignment.*

## Key Takeaways

**TFOA can** cause serious damage and threatens people and property on the ground (*and evidently, the aircraft behind you*). If a rogue panel (or any other 'thing') damages a flight control while falling off or out of the aircraft, it puts flight crews at risk. There are actions we can take to reduce the possibility of TFOA:

**1. Adhere to procedures.** Deviating from procedures invites risk. Procedural non-compliance is cited all too often in TFOA mishap reports. If you don't know or are unsure of the rules or procedures, find out–seek the answer (see #2). Don't allow the normalization of deviance to creep into your work.

**2. Have an inquiring mindset.** Does this panel look right? Did closing that panel feel right? Is our gear as secure as it should be? As in our case above, where'd the B&Ls go? Inquiring minds want to know.

**3. Preflight with purpose.** Find potential issues before they cause problems. While 'preflight' points to flight crews, the same thing can be said about a PC looking over an aircraft on a final check or a maintainer performing a maintenance inspection. **Look with intention and focus**.

**4. Stay focused.** Distraction, fatigue, rushing or even routine tasks can all lead to complacency—don't let it undermine your work ethic.

***And remember, "Let's be careful out there."***